

CLAIMS:

1. A semiconductor device comprising a semiconductor body having a first region of a first conductivity type and, adjacent thereto, a second region of the second, opposite, conductivity type, a third region of the first conductivity type, which is adjacent the second region and separated from the first region by the second region, and a fourth region of the first conductivity type which is separated from the second region by the third region and which has a higher doping concentration than the third region, the first, the second and the fourth region being provided with a terminal, characterized in that the third region is provided with a protection zone of the first conductivity type having a higher doping concentration than the third region, which protection zone is separated from the second region by the third region and is situated near the fourth region, and separated from said fourth region by an intermediate, comparatively high-impedance region.
2. A semiconductor device as claimed in claim 1, characterized in that the third region is formed by a surface region of the first conductivity type adjoining a surface of the semiconductor body, the fourth region and the protection zone being provided as adjacent surface zones of the first conductivity type.
3. A semiconductor device as claimed in claim 2, characterized in that the third region is bounded, at the side opposite the surface, by the second region of the second conductivity type, and the first region of the first conductivity type is formed by a region which, viewed from the surface, is situated below the second region.
4. A semiconductor device as claimed in claim 3, characterized in that the third region is formed by an island-shaped part of an epitaxial layer which is provided on a substrate of the second conductivity type, said first region and said second region being formed by, respectively, a buried layer of the first conductivity type and a buried layer of the second conductivity type, said buried layers being arranged one above the other between the epitaxial layer and the substrate, the second buried layer of the second conductivity type isolating the epitaxial layer and the first buried layer of the first conductivity type from each

other, and said second buried layer being isolated from the substrate of the second conductivity type by the first buried layer.

5. A semiconductor device as claimed in claim 4, characterized in that the island-shaped part of the first conductivity type and the buried layer of the second conductivity type form a diode which serves as a circuit element in an integrated circuit.

6. A semiconductor device as claimed in ~~any one of claims 1 to 3~~, characterized in that the third region and the fourth region form, respectively, a drift region and a drain region of a Lateral DMOS transistor.

7. A semiconductor device as claimed in ~~any one of the preceding claims~~, characterized in that the first region and the second region are provided with a common first terminal, and the fourth region is provided with a second terminal.

8. A semiconductor device as claimed in ~~any one of the preceding claims~~, characterized in that the device is of the RESURF type, wherein the product of the thickness and the doping concentration of the third region is approximately  $10^{12}$  atoms per  $\text{cm}^2$ .